

Appln. No. 09/744,515
Amdt. date September 29, 2003
Reply to Office action of May 28, 2003

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

A complete listing of all claims that are, or were, pending in the application follows. Claims 1, 4, 11, 12, 13, and 15 are amended. New claims 17 and 18 have been added.

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1. (Currently amended) A gearbox adaptor including:
a hub adapted to be engageable with a gear shaft for rotation therewith;
at least one piston mounted within said hub;
means for supplying fluid ~~from~~ through the exterior of the hub to a first face of said piston(s), so as to move ~~said piston(s)~~ a first piston of said at least one piston in a first direction;
at least one gear locatable on said gear shaft adjacent said hub;
at least one clutch means ~~adjacent~~ including a first clutch means positioned between said first piston piston(s) and a side wall of a first gear of said at least one gear, part of ~~at least one~~ said first clutch means being engaged with said hub and a different part of said ~~at least one~~ first clutch means being engageable with ~~at least one gear locatable on said gear shaft adjacent said hub~~ said first gear;
wherein said at least one gear being is freely rotatable relative to said shaft, said clutch means being located and arranged such that movement of said first piston in said first direction inter-engages said parts of said first clutch means to drivingly engage said first gear with said gear shaft.
 2. (Previously presented) The adaptor as claimed in claim 1 wherein said hub, said piston(s), and said at least one clutch means all are concentric and said hub is adapted to be concentrically engageable with said gear shaft.

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3. (Previously presented) The adaptor as claimed in claim 2 wherein said piston(s) and said at least one clutch means both are annular.

4. (Currently amended) The adaptor as claimed in claim 2 wherein said at least one clutch means comprises a clutch pack which consists of a first series of spaced plates, each of which is engaged with the hub for rotation therewith but which is reciprocable parallel to the longitudinal axis of said hub;

and a second series of spaced plates, each of which is engageable with ~~the gear(s)~~ one of said at least one gear mounted upon said gear shaft but which is reciprocable parallel to the longitudinal axis of said hub;

said second series of plates being interleaved with the plates of said first series.

5. (Previously presented) The adaptor as claimed in claim 2 wherein said at least one clutch means and said piston(s) are mounted in a recess in said hub.

6. (Previously presented) The adaptor as claimed in claim 5 further comprising a casing surrounding at least part of the exterior of said hub, said casing being mounted upon said hub but not rotatable therewith;

at least one first fluid passage being formed between the interior of the casing and the exterior of the hub, said first fluid passage being in communication with said means for supplying fluid to a first face of said piston(s), which comprises at least one second fluid passage formed through said hub.

7. (Previously presented) The adaptor as claimed in claim 1 incorporating two said pistons and two said clutch means, the first piston and the corresponding first clutch means being mounted in a first recess formed in one end of the hub, and the second piston and the corresponding second clutch means being mounted in a second recess formed in the other end of the hub;

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wherein part of the first clutch means is engageable with a first gear and part of the second clutch means is engageable with a second gear.

8. (Original) The adaptor as claimed in claim 7 further comprising a casing surrounding at least part of the exterior of said hub, said casing being mounted upon said hub but not rotatable therewith;

two separate first fluid passages being formed between the interior of the casing and the exterior of the hub, each said first fluid passage being in communication with the corresponding said means for supplying fluid to a first face of said corresponding piston, which comprises a second fluid passage formed through said hub.

9. (Previously presented) The adaptor as claimed in claim 1 wherein said fluid is hydraulic fluid.

10. (Previously presented) The adaptor as claimed in claim 1 wherein said fluid is pneumatic fluid.

11. (Currently amended) ~~A sequential gearbox as hereinbefore defined.~~ An adaptor according to claim 1 including a standard gearbox from which the without synchro-hubs and cones have been removed and wherein ~~[[a]] the gearbox adaptor as claimed in claim 1~~ has been fitted to each gear, with part of each hub mounted on the gear shaft and each clutch means engaged engages with the a corresponding gear.

12. (Currently amended) ~~A sequential gearbox as hereinbefore defined.~~ An adaptor according to claim 7 including a standard gearbox from which the synchro-hubs and cones have been removed and ~~[[a]] the gearbox adaptor as claimed in claim 7~~ has been fitted between each pair of adjacent gears, with each hub mounted on the gear shaft between said two adjacent gears

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and part of one clutch means engaged with one of said gears and part of the other clutch means engaged with the other of said gears.

13. (Currently amended) A sequential gearbox ~~as hereinbefore defined~~ including a standard gearbox from which the without synchro-hubs and cones have been removed and wherein a gearbox adaptor as claimed in claim 1 has been fitted to each gear, with part of each hub mounted on the gear shaft and each clutch means engaged with the corresponding gear, further including electronic control means which comprises two micro-switches which are connected via a sequencing arrangement to a set of solenoid valves, one solenoid valve being connected to the means for supplying fluid to each piston such that fluid is supplied to said piston when said solenoid valve is open and fluid is withdrawn from said piston when said solenoid valve is closed;

the control means being such that each time the first micro-switch is closed, the sequencing arrangement closes any solenoid valve which is open and opens the next solenoid valve in a predetermined first sequence;

and each time the second micro-switch is closed, the sequencing arrangement closes any solenoid valve which is open and opens the next solenoid valve in a predetermined second sequence.

14. (Original) The sequential gearbox as claimed in claim 13, wherein said predetermined second sequence is the reverse of said predetermined first sequence.

15. (Currently amended) A sequential gearbox ~~as hereinbefore defined~~, including a standard gearbox from which the having at least one pair of adjacent gears without synchro-hubs and cones have been removed and wherein a gearbox adaptor as claimed in claim 7 has been fitted between each pair of adjacent gears, with each hub mounted on the gear shaft between said two adjacent gears and part of one clutch means engaged with one of said gears and part of the other clutch means engaged with the other of said gears, further including electronic[[.]] control means

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which comprises two micro-switches which are connected via a sequencing arrangement to a set of solenoid valves, one solenoid valve being connected to the means for supplying fluid to each piston such that fluid is supplied to said piston when said solenoid valve is open and fluid is withdrawn from said piston when said solenoid valve is closed; the control means being such that each time the first micro-switch is closed, the sequencing arrangement closes any solenoid valve which is open and opens the next solenoid valve in a predetermined first sequence; and each time the second micro-switch is closed, the sequencing arrangement closes any solenoid valve which is open and opens the next solenoid valve in a predetermined second sequence.

16. (Previously presented) The sequential gearbox as claimed in claim 15 wherein said predetermined second sequence is the reverse of said predetermined first sequence.

17. (New) The adaptor as claimed in claim 4 wherein said first series of spaced plates are engaged with an inner surface of said hub and said second series of spaced plates are engaged with the outer surface of a boss which surrounds the shaft and protrudes from the central region of the side wall of said one ^{or said 2} gear.

18. (New) The adaptor as claimed in claim 17 wherein said first and second series of spaced plates and said piston(s) are all disc shaped, each having a central opening into which said boss protrudes.
